PRZESTRZEŃ Społeczna
Social SPACE

Metaphor and environmental health discourse in Canada's Chemical Management Plan: Hegemonic closures around chemical exposure

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Abstract

This paper examines the *Chemical Management Plan* of the federal Canadian government. To achieve this, it uses metaphor, analogy and allegory to show how environmental discourse is closed off by certain practices which are concerned with how science and government are treated within a neo-liberal arena. Conventional ways of seeing allow for the ideas of sound science based on the production of reliable evidence obtained through careful experiment, modelling and specific forms of measurement. Challenges to this way of seeing science are dismissed as junk science. The paper thus begins by establishing the importance of context and metaphor in environmental health discourse. Context is examined with respect to the values that underpin the social fabric in Canada. The metaphor of Canada as possessing a state devoted to peace, order, and good government is also examined, leading to the idea of inclusivity and action for all. This is achieved not only by using metaphor but also by using cultural-religious antecedents still important in Canada, albeit in an implicit way, namely the idea of the good shepherd allegory and its application through *pastoral care* in its Foucauldian view of state care and control. This notion of good governance is reinforced by the use of good science in the form of quantitative risk assessment and statistical modelling. Furthermore, the ideas of neo-liberalism contribute the values of self-management, choice, and voluntary treatment of health concerns. The data sources for evidence to support this argument are found largely in government and agency websites, especially those relating to Canada's chemical management plan. Discourse analysis is used to reveal rationalities, assumptions, and values which the authors argue are metaphorical and allegorical. They are analysed to demonstrate the importance of metaphor and analogy. The results of this study point to the *closing* off of science and government to particular ways of doing and of seeing so that there appear to be few alternatives to the preferred approaches of the state and its allies. That is the power of metaphor and allegory. They become more than taken-for-granted. For many they become internalised. Thus certain ways of seeing and doing possess hegemonic strength. The discussion points to the nature of challenge and resistance to such hegemonic closures and strengths. Not only are ways of doing internalised but the modes of scientific discourse and of good government are also established. Change will require new politics and culture. That takes a long time.

Keywords: environmental health discourse, chemical exposure, metaphor, Chemical Management Plan, Canada

1. Introduction

1.1. Context and metaphor in environmental health discourse

In this paper, the ideas of analogy, metaphor, and allegory are used to show how debate around chemical risks – as laid out in Canada's Chemical Management Plan (CMP) – is foreclosed and delimited by linguistic closure. It is noted in this paper that this closure is shaped by the founding principles of the Canadian nation-state and its determination to provide peace, order, and good government. These characteristics become metaphorical, defining what is good and possible in a context of preferred ways of acting. Thus the authors identify such ideas in sanctity of life in protected havens (peace), ways of *doing* to achieve consensus through partnerships and the application of rational-legal frameworks (order), and in protecting individual choices and agency through careful action (good government). The metaphoric nature of these principles also shapes what is not possible and what may be included or excluded as part of the Canadian social fabric, and how that shapes what can be achieved. This, as it is shown, provides support for the domination of quantitative risk assessments as the *best science* and the view of limited government interventions. In this section, these ideas of metaphor, analogy, and allegory are highlighted and then a turn is made to the setting of the example and methods, before the findings are discussed.

Metaphors are seen as constructing realities, constituting and being constituted by socio-cultural practice. Those in power can control discourse and cognition by imposing their metaphors which highlight some features of reality while hiding others. There is then an ideational and ideological function for metaphor (see Lakoff, Johnson, 1980). As P. Thibodeau and L. Boroditsky (2011) note, fleeting and seemingly unnoticed metaphors in natural language can help form complex knowledge structures and shape people's reasoning. Metaphors are multimodal and help co-construct rational meaning and can be seen as literal truth even if there is dissonance between source and target for the application of meanings. In the political realm metaphors can appear as clarification or mystification to help develop consensus around actions in order to uphold hegemonic structures and ways of seeing and doing (see Geary 2011). Truth, then, can be

seen as a mobile army of metaphors and other linguistic elements which are rhetorically intensified and over time become fixed, canonical, and binding (see Derrida 1982). The constructions of power and the nature of science are important in this regard. In this paper, therefore, it is argued that metaphor represents the world with ideas that appear unproblematic – science, government, safety, precaution for their stated ends – gathering evidence, protecting the public. But their metaphorical use serves the ends of the state. Thus the authors are not hostile to science, government, etc. but to their uses within a neo-liberal agenda, e.g. the provision of choice, the rule of the market, guidelines rather than regulations.

Scientific *management* and associated *plans* may in themselves be unquestioned metaphors. 'In interpreting a metaphor, we infer an abstract ground for it, and this ground does not consist of shared features previously associated with the tenor and vehicle, but is something new all together' (Cornelissen 2004: 709). J. Cornelissen coins this 'new' structure the 'blend' and proposes that 'there is new meaning in the blend that is not a composition of meanings that can be found in either the tenor (source) or vehicle (target) domains' (Cornelissen 2004: 712). A metaphor's heuristic value 'comes from the two terms or entities (and their respective domains) that it conjoins and the new light that it casts on a specific target subject' (Cornelissen 2004: 706). This is a 'correspondence' model of metaphor. Briefly, he argues that 'metaphoric understanding is creative, with the features of importance being emergent' (ibidem 2004: 708) and, 'that understanding a metaphor creates similarity (as correspondences are constructed) instead of simply emphasising and reporting pre-existing (but previously unnoticed) similarities in the features of the constituents...' A simpler comparison model, as G. Morgan (1983) likewise pointed out, misses this interactive process of 'seeing-as' or 'conceiving-as' by which 'an emergent meaning complex is generated' (Morgan 1983: 709). Management is thus a way of getting things done with and by people in formal settings by using resources efficiently. A plan is the way of achieving goals. Such discourse is now located within the dominant mode of economic organisation, neoliberalism (see Harvey 2005) with its emphasis on the rules of the market, deregulation

(and hence controlled management by guidelines and not law) often at the expense of community and public good (now limited to public security and safety).

Thus an important mechanism for the power of metaphor is analogical reasoning. Metaphors when first encountered are often processed as analogies or structural alignments (see Bowdle, Gentner, 2005). Analogies are systematic comparisons in which a source situation provides information about a target situation (Thagaard 2011). Mapping analogies is difficult as there are many ways in which source and target can correspond. Yet their strength is their ability to transfer representations from one domain to another so they appear naturalistic. Source concepts are often commonplace while target ones may be abstract. For example, the idea of screening is seen as a means of *ensuring* safety and protection as in sun screen, amniocentesis or window screens. What does this mean for chemical screening, which is, in itself an *estimated* calculation of toxicity limited by currently available information? Such metaphoric transfer is a powerful analogous tool, affecting attitudes and perceptions (see Landau *et al.* 2010). Thus problem-solvers or policy makers draw on an array of tools to deal with the matter in hand, especially if uncertainty is a key feature of the domain (see Chan *et al.* 2012). An important transfer that may be found is seeing scientific practice itself as analogy, relevant across domains, reinforcing and reinforced by science as metaphor – evidence-producer, problem-solver. In their rethinking metaphor, G. Fauconnier and M. Turner (2008) note that metaphors bring many domains together (e.g. science is truth, science is not faith), rely on existing cultural and cognitive structures which are sculpted to a new situation (e.g. government for the people). This can be compressed by our very understanding of the metaphor itself (e.g. time is of the essence and therefore the need for rapid assessment and screening, become blended with other linguistic forms (e.g. analogies)) and yet may be challenged by others seeing the metaphor as less relevant for the new domain. But their power is significant as they seem *real* in practice, this being compounded by cultural referents which emotionally link us to the constructed reality. Here cognition is shaped by allegorical comparison, often as P. Thagaard (2011) suggests, by literary source. Effective allegories engage cognitive appraisal and physiologi-

cal perception, the first when the 'story' confirms and activates the goals of the participant (e.g. critics must be listened to but largely ignored as they are seldom scientists). Science uses a *deficit* model which argues that the public lacks scientific knowledge and that their experiences are *subjective* (see Blok *et al*., 2008). The second is a *gut reaction* (e.g. emotional markers when evidence from non-expert sources is presented) – the scoffing reaction to *junk science*, a common reaction for even *excluded* scientists (see Neff, Goldberg, 2005).

Science, particularly in the context of environmental health, is therefore surrounded by multiple imaginations and metaphors, most importantly, the *fact*. Fact is embedded in science as a collectively constructed metaphor, constantly reproduced or altered in order to confirm or falsify (Bourdieu 2004). This, coupled with the emphasis in science on the importance of replicability of these constructs, strengthens the perceived authority of the fact, and embeds the contextual within it. Furthermore, the institutional capital of the fact, i.e. where and by whom it was produced, is highly important as one of the structural conditions for belief in the fact, when *fact* and *science* are impossible to replicate completely, as a series of interchangeable agents vary over time (Bourdieu 2004). In terms of the science around environmental health, the idea of replicability itself becomes less and less plausible, the context always varies, and the same level of exposure may impact different individuals dissimilarly, even in biological matters alone (see Hansen *et al*., 1989). Yet this metaphorical practice still persists within scientific practice and communication today, due mostly to inertia, especially when the end goal is the production of tractable, evidence-based policy solutions and good government.

Despite its technical purpose, the phrase 'peace, order, and good government' (POGG) has also become meaningful to Canadians. It is said to define Canadian values in a way comparable to '*liberté, égalité, fraternité*' in France or 'life, liberty, and the pursuit of happiness' in the United States. Indeed, peace, order, and good government have been used by some scholars to make broad characterisations of Canada's political culture. For example, POGG has been contrasted with the American tripartite motto to

conclude Canadians generally believe in a higher degree of deference to the law (Lipset 1990). D. Creighton (1939) argued that the expression was used interchangeably in the 19th century, by Canadian and Imperial officials, with the expression 'Peace, Welfare, and Good Government'. 'Welfare' referred not to its more narrow modern echoes, but to the protection of the common wealth, the general public good. Good government referred to good public administration, on the one hand, but also had echoes of what is now referred to as good governance within neo-liberal contexts. This incorporates the notion of appropriate self-governance by civil society actors, since one element of good government, especially in a federal system which supports not only individual but provincial and state rights, was thought to be its limitation to its appropriate sphere of responsibility. Today these tasks must be undertaken rationally and democratically with a strong evidence base required for justifying regulatory interference, protection, and governance. To this end, science is employed and science's ways of acting become metaphorically powerful within narratives on the purpose of science.

Furthermore, it is possible to see a journey, promoting protected health and environment through good governance to an enhanced state of well-being. This appears allegorical in the role of *the good shepherd* in that government takes on pastoral care tending to and protecting citizens. It does this by establishing pastoral rule which ensures personal conduct and structures of mutual accountability. Such journeys, with buy-in through partnership, act as quests to reduce and/or conquer insults to public health and the environment (see Stone 1997; Talley 2011). In this way, the power of government becomes authority – caring for all. The religious base of the pastorate is seen by Michel Foucault (2007) as being from where the techniques of modern government emerge. Societal foundations – POGG – are built into the relations between the governed and the governing even in law (see Blake 1999; Petterson 2012). This pastoral allegory in the form of caring government acting in a timely way through rigorous use of science becomes a vital cultural asset, galvanising action in particular ways (e.g. science as *truth* derived in specific ways based on unquestioned quantitative reasoning) – (see Krieger 1994). This pastoral/protector role is best exemplified by government responses

to natural disasters (e.g. through provision of food, shelter, search, and rescue, etc.), but in the analysed case through the rapid development and timely provision of information to citizens (consumers) that enables them to make careful decisions to protect themselves.

Thus in the analysed case, examples of metaphor include government as a protector of public health, science as the true basis of evidence and, societal problems as bounded issues for policy solution. These will be explored in terms of how government's role in the *Chemical Management Plan* (described below) is defined and delimited, how science (and often medical science) restricts understanding of associations and relationships between environmental exposures and health outcomes, and how policy progress requires statements of what is included and excluded from consideration often supported by conventional scientific explanation.

1.2. The background of the Canadian Chemical Management Plan

The *Canadian Environmental Protection Act* (CEPA) (1999) is the Government of Canada's primary vehicle for protecting the environment and health of Canadians. It is also the legislative foundation of Canada's *Chemicals Management Plan* (CMP). Launched in 2006 by a conservative, neo-liberal government, the CMP is dedicated to improving health and environmental protection from exposure to a wide range of potentially hazardous chemical substances through a scientific programme of risk assessment and management (Government of Canada, 2012a). CEPA 1999 sets out several guiding principles in the preamble and embodies them in the administrative duties of the government. Significant emphasis is placed on 'science-based decision-making'. Science is used to evaluate the impact of substances on the environment and human health, identify pathways and extent of exposure to contaminants, guide technological solutions for preventive and control measures, and develop sampling and analytical techniques required for measuring compliance and monitoring the effectiveness of interventions (Environment Canada, 2004). As such, 'science' gains specific taken-for-granted attributes, often only stated if it is challenged. Other key principles within CEPA 1999 include

a focus on 'pollution prevention' (shifting focus away from managing pollution after it has already been created), and the 'precautionary principle' which states that 'where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing *cost-effective* measures to prevent environmental degradation' (CEPA 1999, emphasis added). That is protection of public safety even in the face of uncertainty is paramount, *if* this protection is considered to be economically feasible.

The tasks of assessing and managing risks associated with toxic substances are jointly administered by the Ministries Environment Canada and Health Canada. As of 1994, chemicals introduced into Canada must be assessed to determine risks posed to human health and the environment prior to entering commerce. Approximately 500 new substances are assessed by Government each year (Environment Canada, 2011a). If risks are identified control measures must be implemented prior to a substance being used by industry or entering the marketplace. If effective and acceptable risk management strategies cannot be established, permission for use can be denied. However, prior to 1994, many of the chemicals used in Canada were never subject to ecological or health risk assessments to determine their toxicity and patterns of exposure. Consequently Canada had a backlog of approximately 23,000 'existing substances' in need of being addressed. These substances comprised what became known as the Domestic Substances List.

Under CEPA 1999 it became required that all substances on the *Domestic Substances List* be *categorised* by September of 2006. The *categorisation* process was a priority setting exercise that sought to systematically identify substances that were: (1) inherently toxic to humans or non-human organisms, (2) persistent (i.e. they take a very long time to break down), (3) bioaccumulative (collect in living organisms and end up in the food chain), and (4) of greatest potential for human exposure (Government of Canada, 2007a). The exercise identified approximately 4300 chemical substances meeting these criteria which were divided into high, medium, and low priority for action under the *Chemical Management Plan*. The review of the 200 highest priority substances was re-

cently completed in sequential fashion under the Industry Challenge programme (Environment Canada, 2010a; see also Edge, Eyles, 2013a). All 4300 substances are to be subjected to a preliminary *screening* level risk assessment to determine whether the substance was toxic or capable of becoming toxic as defined in CEPA 1999, Section 64. The extent of a screen assessment is limited to that necessary to determine that a substance is not a priority for risk management. That is the prime purpose is to determine whether no further action, further in-depth assessment, or risk management actions are necessary (Health Canada 2008).

Many of the Industry Challenge substances had little to no published data available on key health endpoints when reviewed under the Categorisation exercise. The Industry Challenge was therefore an attempt to address this problem through the Government issuing voluntary questionnaires and mandatory surveys to chemical manufacturers, importers, and industrial users to provide any information they possessed on chemical properties, uses, imports, releases, toxicity and exposure to inform screening risk assessments (Government of Canada 2012a). The Government also utilised scientific literature and reviews from other jurisdictions. In an attempt to fill remaining data gaps the Government used several predictive computer models and exposure estimation tools to estimate toxicity, industrial releases and environmental concentrations including chemical analogues, and 'Qualitative Structure-Activity Relationship' (QSAR) models (Benfenati *et al.*, 2012; Government of Canada, 2012a).

A substance is 'toxic' under CEPA if assessments determine it is entering or may enter the environment in a quantity that (1) may have an immediate or long-term harmful effect on the environment or its biological diversity; (2) may constitute a danger to the environment on which life depends; or (3) may constitute a danger in Canada to human life or health (CEPA 1999). Assessment determinations of toxicity are therefore exposure driven, not solely based on inherent hazard. As mandated under CEPA 1999 the Government is mandated to apply precaution and reverse the burden of proof onto industry and chemical proponents. That is, 'Challenge' substances are to be classified as CEPA-toxic unless convincing evidence suggesting otherwise is provided. Nevertheless

despite this assertion, of the 193 high-priority substances assessed under the Industry Challenge only 23% were concluded to be CEPA-toxic (Environmental Defence 2011). The weight-of-evidence for all other substances was viewed as insufficient for supporting a CEPA-toxic conclusion (Edge, Eyles, 2013a). Substances that were found to meet the definition of toxic under CEPA 1999 are placed on Schedule 1 of the Act, the *List of Toxic Substances*. This in itself does not automatically subject the substance to controlled regulation but obliges the Government to review a wide range of options and develop risk management plans which can include regulatory measures, requirements for industry to govern themselves through the production of pollution prevention or environmental emergency plans, as well as other non-regulatory guidelines, codes of practice and measures (e.g. future use notifications, further information gathering, monitoring, etc.) (Environment Canada, 2010).

The Government established various processes to engage and solicit feedback from stakeholders and independent experts throughout the CMP process. This included a Stakeholder Advisory Council (comprised of Aboriginal bodies, Consumer Groups, Environment & Health NGOs, Industry Associations), and an independent expert panel called The Challenge Advisory Panel. This latter Panel was not a peer review mechanism but mandated to provide the Government with advice pertaining to their application of precaution and/or weight-of-evidence within screening risk assessments with final decision-making remaining the responsibility of the Minister of Health, the Minister of Environment and the Governor in Council (Government of Canada 2009). The Government makes the screening assessments publicly available in draft form providing a 60-day time period for commentary by interested parties that may bring forth additional knowledge in the form of scientific evidence to support or refute the Minister's decision or file a notice of objection requesting that a Board of Review be established (Environment Canada, 2009). After receiving input the Government determines if further discussions or a Board of Review are warranted and/or incorporates any necessary revisions into their final reports that are published in the *Canada Gazette*.

In October 2011 the Government launched the second phase of the CMP to address additional substances identified as requiring further attention during the Categorisation exercise. Within this phase approximately 500 substances are being assessed and managed through The Substance Groupings Initiative whereby nine different substance groupings have been identified based on structural or functional similarities between chemicals. This approach is largely for the purposes of enhancing efficiencies and enabling high-throughput assessment and management so that Canada can meet its international commitment of sound chemical management by 2020 (Government of Canada, 2012b; UNEP, WHO, 2006).

2. Methods and data

To elicit metaphor, analogy, and allegory, discourse analysis was employed. This approach is devised from interpretive or social constructionist traditions that emphasise *how* various knowledge and *truth* assertions are made and situated in relation to social interests and power relations (Hajer, Verteeg, 2005). It has gained much currency in examining environmental issues (e.g. Hajer 1997; Muhlhausler, Peace, 2006; Carvalho 2007; Edge, Eyles, 2013b). Discourses are a unified set of words, symbols, and metaphors that allow to construct and communicate a coherent interpretation of reality. Discursive structures contain cognitive and normative elements that mediate how policy challenges, processes and interventions are perceived, articulated and consequently adopted or rejected (Raymond, Olive, 2009). Under a discourse analytic approach the analyst must focus on various *artefacts* within a discourse (e.g. words, phrases, metaphors and analogies used in language) that together demonstrate patterns of logic or how, for example, a policy and the policy process itself is *framed* or understood (Yanow 2000). Discourse analysis assists in unveiling underlying rationales, assumptions, judgments, and contentions that enact particular socio-political perspectives, values, identities, relationships, interests, and actions (Gee 2005). It is an effective tool for constructing and communicating alternative interpretations of reality and reflecting upon how

various knowledge assertions relate to broader social interests and power relations (Yanow 2000). It is, therefore, a suitable tool for explicating metaphor.

The data for identifying metaphors of government and science come from Canadian federal government websites. The initial search was within the CMP website, specifically the purpose and progress of the plan. The search began in November 2012 and utilised those sites still available. Several key sites had been taken down although the links appeared to remain. Many of these were Health Canada sites concerning the impact of various exposures, though these sites may have been moved rather than removed and the links not updated. The present authors searched for key ideas about science and government. For example, what was included were a search for the inclusivity and transparency of government, the role of government in protecting the common good (human health and the environment), and the engagement by government of individual citizens and key stakeholders (industry and non-government organisations). For science, its basic characteristics were searched for, e.g. classification/ delineation/categorisation, inclusion and exclusion criteria, the accumulation of fact, the role of expert in delineating what is a fact, and the importance of modelling, monitoring and mathematical simulation. The interpretations are reported in the next section.

3. Findings

3.1. Introduction

The findings are organised around the hegemonic use or closure with respect to science and government, highlighting (through bold text) key words or phrases that point to metaphoric use in guiding this process. The ways of use of science are reviewed, noting some silences with respect to difficult predictions.

3.2. Closure around science

Science is viewed as central by the Government in pursuing the CMP. A weight-of-evidence approach is mandated under CEPA 1999 as is increasingly customary within national and international agreements. In fact in general, science is a systematic

enterprise that builds and organises knowledge in the form of testable explanations and predictions about the universe. In modern use, science also refers to a way of pursuing knowledge, not only the knowledge itself. It is 'often treated as synonymous with "natural and physical science", and thus restricted to those branches of study that relate to the phenomena of the material universe and their laws' (see Bunge 1998). For example, science practised within epidemiology, toxicology and engineering is based on experimentation, modelling and measurement to discover what is equated as *reliable, replicable*, sound evidence. Toxicology aims to determine the dose at which adverse effects occur and the levels a chemical dosage is safe, despite recognised challenges around universal applicability of findings (Hansen *et al*., 1989; CDC 2009). The Government's use of metaphorical descriptors of science not only project confidence in methodological approaches but also that there is indeed a safe universal chemical dosage that can be adequately ascertained and tractably controlled. This is established in many places:

The policy provides decision makers with direction and sets out a ***science-based management*** *framework to ensure that federal programs are consistent with its objectives. [...] Chemical substances are used every day to enhance the quality of our lives. While the majority of these do not affect the environment or human health, a number of them are potentially harmful* ***in certain concentrations****. They should only be used when the associated risks are* ***properly assessed and managed****.*

(Environment Canada, 2011a)

Important for monitoring, surveillance and management are screening and assessment tools, as they can establish *acceptable* levels of exposure for a substance. These activities demand the use of *best* science to determine what should be a priority when the overall task is so intensive, however scientific and public opinion on the quality of these tools often varies (see Harrison, Hoberg, 1991; Benfenati *et al*., 2012). For example, when constructing a *screen* assessment to discover a permissible dose to be controlled for society, simulated modelling using computer software as a predictive quantitative

tool is communicated as analogous to best practice within preferred experimental sciences (e.g. *in vivo* approaches involving living organisms):

To conduct risk assessment, scientists conduct research and look at the existing studies from around the world, and if they are missing something important, ***they will use computer models*** *or* ***compare the chemical substance to others*** *with similar characteristics.*

(Government of Canada, 2011a)

Chemicals with common features (e.g. structure, physicochemical properties), are presumed to exert similar toxicological properties or biological response variables due to a common mode of action (Government of Canada, 2010). Quantitative approaches as analogous to *best science* also has, in our view, metaphoric significance in that other forms of evidence are ignored, criticised or dismissed (e.g. anecdotal claims, value-based assessments, lay epidemiology, etc.). Quantitative science is not only viewed as most reliable but perhaps most importantly as permitting tractability and rapid, high-throughput assessment which is necessary if the Government is to meet their goal of sound chemical management by 2020 (Edge, Eyles, 2013a):

The number of chemical substances identified by ***categorisation*** *as needing further attention makes it impossible to evaluate all of them at once. Substances have to be prioritised so that those of greatest potential concern are addressed first.*

(Government of Canada, 2011a)

As ***science cannot always accurately predict*** *the effects that a substance will have on the environment or on human health, managing toxic substances effectively requires taking a proactive,* ***cost-effective*** *approach […] The federal government's Toxic Substances Management Policy puts forward a* ***preventive and precautionary approach*** *to deal with* ***all substances****".*

(Environment Canada, 2010b)

It is conceded that science can be inaccurate in prediction, but remains acceptable as long as the risk is addressed early and rapidly. The government recognises that they cannot conduct in-depth substance-specific research for all chemicals, thus good governance and protection of the flock is pursued through an increased reliance upon high-throughput models that can be conducted rapidly in order to reduce uncertainties, prioritise a large number of substances for subsequent toxicological testing and meet regulatory obligations in a cost-efficient manner. Quantitative prediction and screening permits the opportunity to set priorities as it is not feasible, economically or technically, to move on all fronts at once given the vast numbers of substances that must be addressed. Screening and priority-setting permit the metaphors of government to co-mingle with those of science. Government through the use of science is the good shepherd. Activities of rapid assessment and prioritisation point to the pastoral care of government as it protects its citizens.

The CMP therefore sees an evidence-based approach as the most appropriate way forward. Science is central to this task, identifying the groundswell of support for evidence-based public health and environmental protection. In this, a pragmatic and progressive approach is taken with progress being defined as the full characterisation of chemicals of concern by 2020. To get there, evidence must be gathered and accumulated through the use of the most appropriate measures and techniques, found in quantitative science with its reductionism to basic analytic approaches and the appearance of context-free evidence for good government for good public health (see Morrell 2008). Correctly collected scientific evidence is *truth.*

Yet there has been resistance to the idea that risk assessments within the CMP practice the *best science*. Indeed *metaphor* contains the ways in which its power can be challenged if for some it does not resonate with their 'reality'. Different modes of reasoning and everyday tactics can challenge these dominant modes of discourse (Fleming 2005). For example, concerns have been expressed about the reliability and validity of chemical analogues and QSAR models with examples being cited of substances that fit the criteria of analogues, yet are known to exhibit significant differences in toxicity

(Sang *et al*., 2003). The argument being that under conditions where analogues or models are not well validated the onus should be placed upon industry to generate experimental toxicity data to address data gaps, and until such evidence is provided the worst-case scenario should be assumed and precautionary policy implemented. There is also concern that the push for rapid, high-throughput modelling places the emphasis on getting the job done as opposed, to being thorough and due diligent in ensuring human and ecological health is adequately protected (Edge, Eyles, 2013a). Regardless of obligations to meet nationally and internationally imposed time commitments, many believe these should not be used as justification for not implementing mandatory evidence-gathering provisions onto industry or obligations to conduct further empirical toxicity testing (Sang *et al*., 2003; Scott 2009; NNEWH 2011).

The CMP's current assessment methodologies have also been criticised. They assume the greater the dose of chemical exposure, the greater the harm to human health, and that human bodies can safely accommodate some degree of chemical exposure based on the idea of *thresholds*. New research now shows that a number of chemicals, including endocrine disruptors, can cause adverse health impacts at low doses, can increase risk at any level of exposure (especially during critical windows of development), and can have different modes of action (e.g. epigenetic effects) that lead to diverse health outcomes (see Brouwer, *et al*. 1999; Rubin 2011).

Finally, the Canadian Environmental Network (CEN) has noted criticisms by a number of independent bodies and non-governmental organisations participating in CMP (Tilman *et al*., 2010; CEN 2010). They argue that the CMP, and specifically the Challenge, has been insufficient in evaluating chemicals, applying proper precaution and adequately protecting public health referring to the limited number of substances that have been found CEPA-toxic thus far, despite the fact that they were originally categorised as high-priority. *Best practice* science is questioned, but this questioning has been largely ignored by government. It may be necessary for democratic input, yet unnecessary for changing scientific practice.

3.3 Closure of government

The federal government sees itself as a willing partner and facilitator in managing chemical substances. In managing risk the government claims to take actions to address key exposure sources, sometimes using 'the most appropriate legislation'. It also protects consumers from potentially dangerous cosmetics, foods, pharmaceuticals and other hazardous products through the provision of information that enables informed decision-making. The government's emphasis on choice and the need for consumers/citizens to take actions which protect themselves is a dimension of government's pastoral care. *Good government* needs partners to ensure the flock is cared for.

The Government of Canada plays a ***key role in protecting us*** *from the risks of chemical substances under a number of laws. [...] While the Government of Canada plays a key role, every order of government is involved. Municipalities run programs and make rules on such pollution prevention activities as recycling. The provinces and territories govern a number of areas related to risks of chemical substances including, for example, industry permits and licenses. The provinces and territories also look after the management and delivery of health services for their residents.*

(Government of Canada, 2007b)

Due attention is paid to stakeholders. This is not only the public but industry which can with its inputs into categorisation and priority setting help determine what is done when and in what ways (e.g. regulation, law, guideline, agreement). Thus the burden of pastoral care is shifted to include not only government actions but care by compassionate industry and aware consumers.

Government risk managers determine how a chemical substance gets into the environment (this is done during the risk assessment process), then collect additional information on who uses the chemical substance and in what ways. The next steps in risk management are to identify, evaluate and implement tools to ***reduce, eliminate or prevent*** *risks.*

(Government of Canada, 2011b)

Yet it is not the government's identified job to reduce or prevent all risks. It claims that everyone is a risk manager, based on early reports from the Privy Council Office (2000) and cited in current *It's Your Health* guides from Health Canada (e.g. chemicals 2012) and through using the best evidence, provided, it would appear, by government, all citizens can make informed decisions about living with chemicals. They are thus consumers making rational choices, given their goals and means without government interference but with its protection through providing information. Its power to protect extends to it being able to re-order how things are done through the use of regulation and law. Thus, *If the Government of Canada is not satisfied that risk has been reduced or prevented, it can prohibit the use of the chemical substance altogether* (Government of Canada, 2011b). Yet the preference is to protect through 'inclusive risk management', involving the public as risk-managers in that they are us, and we are them.

The government endorses other inclusive management strategies with other stakeholders, specifically industry, that are also voluntary and collaborative in nature. Examples include the Chemical Industry Association of Canada's *Responsible Care* programme, or Environmental Performance Agreements (EPAs). *Responsible Care* is essentially an ethical set of principles designed by industry groups that are intended to reflect to society their commitment to innovate and continuously improve their environmental, health and safety performance records (Chemical Industry Association of Canada, 2013). While legislation is conceded as important, both industry and government prefer self-directed approaches:

It sets a bunch of codes, guidelines and standards and has community and stakeholder involvement and tries to make sure that we're tracked as doing the right thing and seen as doing the right thing. Sure legislation is also important but our greatest strength is Responsible Care […] it gives our companies a common culture, they're able to move beyond their competitive issues in healthy and safety areas based on that common Responsible Care Culture.

(Interview with 'Greg', industry representative)

Similarly, albeit with more direct Government involvement, Environmental Performance Agreements are:

an agreement with core design criteria negotiated among parties to achieve specified environmental results. Environment Canada may negotiate a performance agreement with a single company, multiple companies, regional industry associations, a sector association or a number of sector associations. Other government agencies (federal, provincial, territorial or municipal) and third parties (non-government organisations) may also be parties to such agreements. Environment Canada, for example, has been engaged in several three-party agreements with industry groups and provincial environment ministries. ***These agreements benefit all parties*** *(e.g. more comprehensive coverage of environmental issues, greater certainty for industry) […] For industry participants, an Environmental Performance Agreement will stipulate clear and measurable performance standards and include effective accountability mechanisms".*

(Environment Canada, 2012)

One example is the vinyl industry:

The purpose of the Environmental Performance Agreement Respecting the Use of Tin Stabilisers in the Vinyl Industry is to prevent the release of tin stabilisers to the environment by ensuring that these substances and their packaging materials are handled, stored, used and disposed of in a responsible manner".

(Environment Canada, 2012)

Yearly reporting is required, and

As of March 2011, there were 34 signatories to the Agreement that continued to use tin stabilisers. It must be noted that there have been new signatories to the Agreement as well as some facility closures. The verification program to confirm that the Guideline is being implemented will be conducted at each participating facility during the five-year period (March 10, 2008, to March 9, 2013) provided for in this Agreement. Corrective action plans will be agreed upon for any deficiencies that are still unresolved when the final site visit report is issued.

(Environment Canada, 2012)

In virtually all disclosures, no corrective action was required, and in one case, a further review of the manufacturer's report was necessary. Another metaphor is present: government is in the business of helping business, part of the neo-liberal agenda of most advanced economies (Levy, Newell, 2002; Gill 1998). Management becomes manipulation of issues to ensure the smooth running of industrial and market forces (see Harvey 2005).

The Government's approach to risk management so far reveals a preference for non-regulatory mechanisms that have little legal standing, focusing action on end-of-the-pipe solutions, and generally aiming to maintain continuous chemical use with only slight reductions in releases (Chakravartty 2010; de Leon *et al*.. 2010). Environmental and health groups have criticised these approaches stating that:

These management approaches, as with the assessment process, ***do not require industry to submit data on vulnerable populations*** *(such as women), chronic toxicity, endocrine disruption potential, neurotoxicity or cumulative/synergistic effects that might differentially affect health. Additionally, these mechanisms provide little information on what they involve, have only limited opportunities for the public to engage in subsequent assessments, and can permit the continued usage of a range of toxic chemicals.*

(NNEWH 2011)

Business as usual for business? Managing for the protection of business through manipulating considered information?

4. Discussion and conclusion

In this paper, an attempt was made to show how the deeply held metaphors about good government and the beneficence of science in a neo-liberal arena have resulted in the management of chemical substances in particular ways in Canada. Linguistic use of metaphor, analogy and allegory assist in contributing towards the unproblematic or specific treatment of issues of uncertainty so that the CMP is not on the

broader public agenda. It is in good hands. Management is framed as a science-based quest for good practice. The allegory is of the good shepherd, as expressed in John 10, 14-16: 'I am the good shepherd. I know my own, and I'm known by my own; even as the Father knows me, and I know the Father. I lay down my life for the sheep. I have other sheep, which are not of this fold. I must bring them also, and they will hear my voice. They will become one flock with one shepherd'. The religious origination, as identified by Michel Foucault (2007), remains. As Canada's Prime Minister, a conservative politician with strong ties to the oil industry, said:

When we took office, we promised to replace environmental talk with environmental action. Action that's practical, realistic and actually delivers results – because results are what matter. [...] we cracked down on the release of mercury into the environment. And why we set out targets for reducing air pollution and greenhouse gas emissions for the first time ever in Canada, in our Clean Air Act. All these initiatives reflect our commitment to a healthier environment for all Canadians [...] This plan [CMP], which I am announcing today, includes ***realistic and enforceable*** *measures that will substantially increase protection of Canadians from dangerous chemicals. In fact, it will make Canada a world leader in the testing and regulation of chemicals that are used in thousands of industrial and consumer products. [...] Over the next four years, we will tighten regulations* ***and accelerate*** *risk assessment for thousands of chemicals. Our plan will require substantial investment of public funds, but in the long run it will save money by* ***reducing expenditures on public health and the clean-up of contaminated land and water****. While Canada has always been responsible when it comes to chemical management, I'm proud to say that we will become a world leader because of today's announcement [...] We are ahead of America and Europe, and Canada's New Government is committed to keeping our nation at the forefront of health and environmental protection. Our chemicals management plan is the next step in the process."*

(PMO 2006)

A world leader, then, in pastoral care, enabling business and industry to know government targets, and shifting the *responsibility* of good government to these groups

in the name of 'reducing expenditures'. Thus the target of good government is less government and its source is public safety.

As a good shepherd, the government will (or claims to) make Canadians safe (in the fold) by developing the best solutions (the quest) and enforcing measures for protection (of the flock). There is metaphoric strength in this framing of the plan. As Environmental Defence, a Non-Government Organisation (NGO) noted, the

CMP has been an important and valuable program. The Challenge in particular, has resulted in timely, systematic chemical assessments and frequent, ***world precedent-setting risk management decisions****. This is no small feat considering the number of substance assessments and the limited timeframe for such to occur.*

(Environmental Defence, 2011)

But this may be seen as managing potential problems away through delay and claiming to ensure public safety. While critical of other delays in the petroleum sector, the NGO underscores the value of good governance to protect the public good. Metaphorical reasoning is accepted and the slow/non-existent progress is accepted. It thus recognises the roles of Alberta Environment and Environment Canada in acknowledging that naphthenic acids are the 'primary source of toxicity' in tar sands tailings. But naphthenic acids remain excluded from the 164-strong priority list of the Petroleum Stream, a specific section in CMP for oil products. Naphthenic acids are one of the main pollutants responsible for the toxicity of tar sands tailings to aquatic organisms, and have been shown to harm liver, heart and brain function in mammals. They are also very long-lived, taking decades to break down. Thus why does the metaphor take the form it does? Canada is a large resource-based economy with political power emanating from the oil sands. The wealth it produces makes Canada a good place to live, helping to protect its welfare and well-being. If the metaphor can take on the form of a deeply held cultural value, most will agree with this statement.

Yet the metaphoric strength of sound science and government-run processes appears to overcome these difficulties. And the mantra of peace, order, and good govern-

ment for the common good is central to this. Given Canada's national motto – 'Peace, Order, and Good Government' – it is perhaps not surprising that Canadians believe they have a *comparative advantage* in the area of good governance. This appears to make Canada a kinder, gentler place than the United States – and its pursuit of life, liberty, and the pursuit of happiness. POGG has, of course, done nothing of the sort. As a matter of historical fact, it was imperial boilerplate that dated back to the 1700s. Aside from Canada, this ubiquitous phrase turned up in the colonial constitutions of Australia, New Zealand, South Africa, and Ireland – and other British territorial domains. It does limit federal action with respect to making laws in matters of provincial jurisdiction. But it remains a central tenet of the Canadian polity. Furthermore, these metaphors are used not through their comparators but as hegemonic institutions we live by in a taken-for-granted way. POGG underpins much of the Canadian mind-set about how Canada acts and what it stands for, even if it fails to deliver. Science is the basis of true evidence and it is assumed its ways of acting are rational and value-free, despite at the very least the centrality of assumptions, including what is included/excluded and the neglect of the context brought forth by the researcher. The quest for the common good and protection has been assimilated by the powerful – much appears to be done but very little changes. We remain 'protected' in the fold. In the CMP, environmental health disclosure is then fettered by the metaphor of good science, the allegory of pastoral care and the agenda of neo-liberalism which has been labelled itself as a hegemonic project (see Hall 2011). These discourses shape the conduct of conduct with good science closing on and around quantitative risk assessments and computer modelling, and good government around the provision of rapid assessment, minimal interference to the free market and economic competitiveness, and opportunities for individuals to make safe choices.

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wpłynęło/received 07.02.2013; poprawiono/revised 15.05.2013.